

SPCS 1762  
PATENTREMARKSRestriction requirement

The Office action requires applicant to elect prosecution of claims 1-17 and 23-30 which are drawn to an apparatus (Group I) or claims 18-22 which are drawn to a process for coating an item in a cleanroom (Group II). Applicant hereby confirms the oral election of claims 1-17 and 23-30 (Group I) for examination on the merits without traverse. Claims 18-22 are cancelled herein without prejudice to applicant's right to file a divisional application directed to the subject matter of claims 18-22.

Applicant notes that the examiner apparently inadvertently referred to claims 17-22 as being withdrawn from consideration as being drawn to a non-elected invention on page 2 of the Office action dated December 13, 2005. Previous references by the examiner to the Group II claims (18-22) were stated correctly.

Status of claims

Claims 1-3, 6-17 and 23-35 are pending in this application. Applicant appreciates the indication that claim 28 has been determined to contain patentable subject matter subject to the objections for dependence on a rejected claim.

Claims 1, 3, 6, 10, 12, and 23 are amended herein. Specifically, claims 1, 10, and 23 have been amended to remove "vapor deposition" from the preamble of the claim. Additionally, claims 1 and 10 have been amended to specify that the deposition chamber includes an inlet for flow of coating material from a source outside the deposition chamber into the deposition chamber.

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Claim 3 has been amended to specify that the vaporizer, pyrolysis furnace, and service door are on the service side of the apparatus. Claims 3 and 12 have also been amended to specify that the apparatus is accessible from inside the cleanroom through an opening in a wall of the cleanroom. Additionally, claims 3 and 12 have been amended to specify that the shroud is distinct from the cleanroom wall at least partially surrounding the access door to isolate the access door from the service side of the apparatus and to allow isolated access to the access door and deposition chamber from inside the cleanroom. Claim 23 has also been amended to specify that the shroud is distinct from the cleanroom wall and that it at least partially surrounds one but not both of the at least two doors to allow isolated access to the one door and the deposition chamber from inside the cleanroom.

No new matter has been added by the above claim amendments.

New claims 31-35 have also been added. Claims 31 and 32 depend from claims 12 and 23, respectively, and specify that the shroud completely surrounds the access door. Support for claims 31 and 32 can be found in the specification and, in particular, in Figs. 6, 11, and 12, and accompanying description. Claims 33, 34, and 35 depend from claims 1, 10, and 23, respectively, and specify that the coating material is a polymer and that the deposition chamber is a chamber where the coating material polymerizes on an item to form a polymer coating. Support for claims 33-35 can be found in the specification and, in particular, on page 3, paragraph [0030] and page 5, paragraph [0044] of applicant's published application (2005/0098114).

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Claim rejections - 102(b)

Claims 10-14 are rejected as being anticipated under 35 U.S.C. 102(b) by Seddon (4,276,855).

As amended, claim 10 specifies that the deposition enclosure includes an inlet for flow of coating material from a source outside the deposition chamber into the deposition chamber. Claim 1, which was not rejected by the examiner under 102(b) by Seddon, has also been amended to include a similar limitation.

Seddon fails to show or suggest use of an inlet for flow of coating material from a source outside the deposition chamber into the deposition chamber. Seddon is directed to a coating apparatus consisting of a housing 11 and a means for establishing a vacuum in the housing. Seddon teaches the use of one or more sources 47 of coating material mounted within the housing for providing a vapor stream having an approximate cosine distribution. Col. 1, lines 61-64. The one or more sources 47 mounted within the housing can be conventional sources, such as electron gun type sources each of which provide the vapor stream having an approximate cosine distribution. Col. 2, lines 59-65. Thus, the substrates are coated by the coating materials evaporated from the sources. Col. 3, lines 12-13.

According to Seddon, the coating apparatus is operated by first opening the loading doors of the apparatus and loading the racks carrying the substrates to be coated into the apparatus. The coating sources 47 are then supplied with material, after which the loading doors are closed. The racks are rotated about an axis and the sources are placed into operation forming the vapor streams which impinge upon the inner surfaces of the substrates. Col. 3, lines 53-68. Because the coating material

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source is already in the housing and because the coating material is formed in the housing, there is no need to provide an inlet for the flow of coating material from a source outside the housing into the housing. Thus, Seddon's coating apparatus is fundamentally different from the claimed invention where gaseous coating material is formed outside the deposition chamber and then flows into the deposition chamber through the claimed inlet.

Accordingly, applicant submits that claim 10 is patentable over Seddon.

Claims 11-14 depend directly or indirectly from claim 10, and are patentable for the same reasons as claim 10 as well as for the additional elements they require.

Additionally, amended claim 12 specifies that the apparatus is accessible from inside the cleanroom through an opening in a wall of the cleanroom, and that the enclosure further comprises a shroud distinct from the cleanroom wall at least partially surrounding the access door to isolate the access door from the service side of the apparatus and to allow isolated access to the access door and deposition chamber from inside the cleanroom. See Figs. 4, 4A, and paragraphs [0039] and [0040]. Thus, the shroud is a structure distinct from the cleanroom wall and is claimed as such. See, e.g., Figs. 6, 11, and 12. Seddon fails to teach or suggest this feature. The line 26 shown in Fig. 2 of Seddon simply represents the boundary between the clean room and the dirty room. The line 26 could be a wall, but not a wall and a shroud distinct from the wall. Accordingly, claim 12 is not anticipated by Seddon for this additional reason.

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PATENTClaim rejections - 103(a)

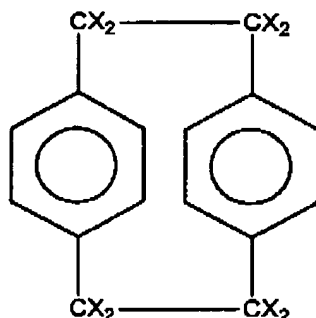
Claims 1-6, 23, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seddon (4,276,855) in view of Beach et al. (5,534,068).

As noted above, claim 1 has been amended to specify that the deposition enclosure include an inlet for flow of pyrolyzed gaseous coating material from a source outside the deposition chamber into the deposition chamber.

As discussed in detail above, Seddon fails to show or suggest an inlet for flow of pyrolyzed gaseous coating material from a source outside the deposition chamber into the deposition chamber. Because the coating material is already in the housing, there is no need to provide an inlet for the flow of coating material from a source outside the housing into the housing.

Even assuming that Seddon taught or suggested an inlet for flow of pyrolyzed gaseous coating material from a source outside the deposition chamber into the deposition chamber (which it clearly does not), Seddon fails to show or suggest a vaporizer for vaporizing solid coating material and a pyrolysis furnace for heating the vaporized coating material to form a pyrolyzed gaseous coating material. In an attempt to find each and every element of claim 1 as required by the M.P.E.P. for a determination of *prima facie* obviousness, the Office cites the Beach et al. reference for combination with Seddon.

Beach et al. is directed to the rapid and efficient deposition of Parylene AF4 onto silicon wafers. As noted in Beach et al., parylene is a term used to describe a class of poly-p-xylylene polymers, which are derived from an organic dimer molecule having the structure:

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wherein X is typically hydrogen or halogen. The parylene coatings are formed from the above dimer by vaporizing the dimer, pyrolyzing the dimer (i.e., cleaving the dimer into the monomer vapor form), and feeding the monomer molecules to a deposition chamber wherein the monomer molecules deposit and polymerize onto the substrate within the deposition chamber. See Col. 1, line 4 to Col. 2, line 25.

In particular, Beach et al. teach a frusto-conical shaped deposition bell that is positioned over a wafer and clamped to a platen assembly upon which the wafer rests, forming a bell-shaped deposition chamber. Parylene AF4 is vaporized in a vaporization chamber and the vaporized material travels to a pyrolysis chamber which pyrolyzes the vaporized Parylene AF4 into its monomer form, as described above. From the pyrolysis chamber, the vaporized, pyrolyzed coating material travels through a post-pyrolysis chamber and through an inlet in the deposition chamber. The monomer vapor coating material flows throughout the deposition chamber and polymerizes and deposits on the surfaces of the wafer. The frusto-conical shaped deposition chamber of Beach et al. is designed to minimize deposition chamber volume and maximize the flow of vapor over the surface of the wafer. Beach et al. also teach enveloping the entire deposition apparatus in an atmospheric shroud

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provided with an inert nitrogen atmosphere to ensure the coating process is carried out in an oxygen free environment.

"Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art." M.P.E.P. § 2143.01. Here, one of skill in the art would not and could not be motivated to modify Seddon with Beach et al. because these references are directed to two entirely different coating methods having entirely different requirements.

As noted above, Seddon teaches the use of coating sources that provide an approximate cosine distribution such as electron gun type sources. See, e.g., Col. 1, lines 36-41; Col. 2, line 59 to Col. 3, line 3; and Col. 3, line 63 to Col. 4, line 1. Based on Seddon's disclosure, one of skill in the art would recognize that Seddon's apparatus is directed to physical vapor deposition methods such as electron beam evaporation and sputtering.

Electron beam evaporation and sputtering involve directing some form of energy or energized particles (e.g., via an electron gun) at an inorganic source material (i.e., a block of metal such as platinum or tin), causing the source material to evaporate. The evaporated metal ions travel from the source material to the substrate in a direct, line-of-sight path; thus, only one surface of the substrate is coated. As Seddon notes, the vapor streams "impinge on the inner surface of the substrates 53 carried by the racks and facing the sources." See Col. 3, line 67 to Col. 4, line 1.

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Further, the metal ions formed by these physical vapor deposition methods evaporate in accordance with an approximate cosine distribution (as noted by Seddon); therefore, the coating on the substrate is generally not uniform. To account for this lack of uniformity, Seddon positions his racks such that they rotate about axes which are offset from the horizontal by less than 45°. See Col. 2, lines 41-43 and Figs. 1 and 2. Racks 43 and 44 "extend outwardly at an angle to a line normal to the support structures 41 and 42 so that the inner surfaces of the same generally approximate the cosine distribution intensity of the vapor." See Col. 2, line 65 to Col. 3, line 3.

In contrast, Beach et al. disclose an apparatus for the deposition of parylene. Unlike the inorganic source materials (e.g., metals) utilized in the method of Seddon, Beach et al. disclose vaporizing and pyrolyzing an organic, polymeric material to form a plastic, non-conductive coating on a substrate. Further, the Beach et al. coating methods are three-dimensional coating methods. That is, while Seddon's apparatus coats only one surface of an article, in the Beach et al. apparatus the vaporized, pyrolyzed parylene flows throughout the deposition chamber to coat all surfaces of the substrate. Because Seddon and Beach et al. are clearly directed to two entirely different coating methods, one of skill in the art would not be motivated to combine these references.

Further, each of the problems referred to and addressed in Seddon are unique to that type of coating method, and each of the problems referred to and addressed in Beach et al. are unique to a completely different coating method. Because Seddon does not suffer from the drawback Beach et al. aims to solve, namely, maximizing the flow of pyrolyzed gaseous coating materials over silicon wafers and minimizing deposition chamber



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volume using a bell-shaped deposition chamber, there is no motivation to modify Seddon with Beach et al.; and there is no motivation to modify Beach et al. with Seddon because Beach et al. does not suffer from the drawback that Seddon aims to solve, namely, providing a relatively uniform coating of an inorganic coating material having an approximate cosine distribution intensity on a substrate by mounting the substrate to a rotor having a shape, location, and axis of rotation which complements the cosine distribution intensity of the coating material.

As a result of the fundamental differences between Seddon and Beach et al. discussed above, one of skill in the art would not combine the teachings of both as suggested by the examiner. Indeed, any modification of Seddon to incorporate the teachings of Beach et al. would negate the result intended by Seddon, i.e., articles coated on only one surface with an inorganic material. Instead, the article would be coated on all surfaces with an organic material. Thus, Seddon actually teaches away from the hypothetical modification suggested by the examiner.

For these reasons, one skilled in the art simply would not be motivated to combine the references of record, nor is there any teaching or suggestion for the combination. As such, the Office has not met its burden in establishing a *prima facie* case of obviousness.

In view of the foregoing, applicant respectfully requests reconsideration and withdrawal of the rejection of claim 1.

Claims 2, 3, and 6

Claims 2, 3, and 6, which depend directly or indirectly from claim 1, are submitted as patentable for the same reasons as claim 1, and for the additional elements they require.

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Additionally, amended claim 3 specifies that the vaporizer, pyrolysis furnace, and service door are on the service side of the apparatus; that the shroud is distinct from the cleanroom wall and at least partially surrounds the access door; and that the shroud has the following function - "to isolate the access door from the service side of the apparatus and to allow isolated access to the access door and deposition chamber from inside the cleanroom." The Beach et al. patent fails to disclose such a shroud. Rather it discloses a shroud 26 which envelops the entire apparatus for containing an inert nitrogen atmosphere for the purpose of excluding oxygen from the deposition chamber. This is in sharp contrast to applicant's claimed shroud which isolates one part of the apparatus (the access door) from another part of the apparatus (the service side, including the vaporizer, furnace and service door). As a result, the shroud allows isolated access to the access door from inside the cleanroom. In other words, a person in the cleanroom can, by using the shroud, gain access to the access door and deposition chamber without contamination from the service (dirty) side of the apparatus. There is simply no teaching or suggestion of such an arrangement in Beach et al. If this reference teaches anything, it teaches enclosing Seddon's entire apparatus with a shroud. There is simply no teaching of applicant's claimed shroud which has an entirely different function, i.e., isolation of the access door from the service side of the apparatus so that the access door can be accessed from the cleanroom without contamination from the service side of the apparatus.

For these additional reasons, amended claim 3 is submitted as patentable over the references of record.

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Additionally with respect to claim 6, the removable racks in Seddon are clearly not a shroud. It is unclear to applicant how the removable racks of Seddon can be construed in such a manner as to render claim 6 obvious. If it is the examiner's position that the removable racks themselves are the shroud, which does seem to be a reasonable interpretation of the term "shroud", then why does the examiner also refer to the removable racks as being placed "inside a shroud provided around the deposition enclosure"?

For these additional reasons, claim 6 is submitted as patentable over the references of record.

Claim 23

Amended claim 23 is similar to claim 1, and specifies that: the apparatus include a shroud distinct from the cleanroom wall at least partially surrounding one but not both of the at least two doors to allow isolated access to said one door and the deposition chamber from inside the cleanroom. Similar to amended claim 3 above, Beach et al. fails to disclose a shroud having the function of amended claim 23, namely, isolating one part of the apparatus (one door) from another part of the apparatus (the other door) to allow isolated access to the one door and to the deposition chamber from inside the cleanroom. As discussed above, Beach et al. disclose enveloping the entire apparatus in an atmospheric shroud to exclude oxygen from the deposition chamber. There is simply no teaching or suggestion of using a shroud to isolate one door of the apparatus from another.

For these reasons, claim 23 is submitted as patentable over the references of record.

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PATENTClaims 29 and 30

Claims 29 and 30, which depend directly from claim 23, are submitted as patentable for the same reasons as claim 23 as well as for the additional elements they require.

Further, wall 29 in Beach et al. is the top wall of a housing 25, not a wall of the shroud 26. See, e.g., Fig. 2; Col. 5, lines 21-22 and 31-32; Col. 8, line 26; and Col. 9, lines 31 and 55. It is not clear how the subject matter of claim 29, further defining applicant's shroud as having a wall for receiving the deposition enclosure, is obvious in view of this reference since the shroud 26 has no opening in it.

Claims 7-9, 15-17, and 24-27

Claims 7-9, 15-17, and 24-27, which depend directly or indirectly from claims 1, 10, or 23, are also submitted as patentable over the references of record for the same reasons as claims 1, 10, and 23, and for the additional elements they require.

New Claims

New claims 31 and 32 depend from claims 10 and 23, respectively, and further specify that the shroud completely surrounds the access door.

In addition to being patentable over the references of record by virtue of depending indirectly from claim 10 (claim 31) and directly from claim 23 (claim 32), discussed above, claims 31 and 32 are unanticipated by and patentable over the references of record, and in particular Seddon. Whether considered alone or in combination, the references of record further fail to show or suggest a shroud that completely surrounds the access door. It should be reiterated in this

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regard that nothing in Seddon or Beach et al. shows or suggests a shroud distinct from the cleanroom wall; nor does Beach et al.'s atmospheric shroud isolate an access door of the deposition enclosure from other parts of the deposition apparatus to allow isolated access (through the shroud) to the access door and deposition chamber from inside a cleanroom.

For the reasons stated above, new claims 31 and 32 are submitted as patentable over the references of record.

New claims 33, 34, and 35 depend directly from claims 1, 10, and 23, respectively, and further specify that the coating material is a polymer and that the deposition chamber is a chamber where the coating material polymerizes on an item to form a polymer coating. These claims are also submitted as patentable over the references of record for the same reasons as claim 1, 10, and 23, and for the additional elements they require.

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PATENTCONCLUSION

For the reasons provided above, applicant respectfully requests allowance of claims 1-3, 6-17 and 23-35.

Applicant does not believe that a fee is due in connection with this response. If, however, the Commissioner determines that a fee is due, he is authorized to charge Deposit Account No. 19-1345.

Respectfully submitted,



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